Claims

1. An evaporator for the exchange of heat between an airflow and a refrigerant fluid with the latter passing from the liquid state to the gaseous state, especially for air-conditioning the passenger compartment of a motor vehicle, comprising a tube bank consisting of a single row of flat tubes (1) stacked alternately with corrugated spacers (2) holding the tubes spaced apart from one another by a distance d and the corrugations of which define passages for the airflow in the direction (F1) of the width of the tubes, the two ends of each tube communicating respectively with two fluid boxes (31, 32), affixed or not affixed, situated at opposite ends from one another with respect to the said tube bank, in such a way as to define a journey in at least two passes for the refrigerant fluid in the evaporator, wherein its dimension l in the said direction lies between 20 and 55 mm and wherein the distance d lies between 4.0 and 7.6 mm.

2. The evaporator as claimed in claim 1, wherein the total thickness (E_e) of a tube lies between 1.0 and 2.7 mm.

3. The evaporator as claimed in one of claims 1 and 2, wherein the wall thickness (e_1) of a tube lies between 0.2 and 0.7 mm.

4. The evaporator as claimed in one of the preceding claims, wherein the internal thickness (E_2) of a tube lies between 0.6 and 1.8 mm.

5. The evaporator as claimed in one of the preceding claims, wherein the corrugation half-period (p/2) of the spacers lies between 1.0 and 1.8 mm.

6. The evaporator as claimed in one of the preceding claims, wherein the wall thickness (e_2) of the spacers lies between 0.05 and 0.1 mm.

7. The evaporator (10) as claimed in one of the preceding claims, wherein the tubes and the fluid boxes (18, 21) are in the form of a stack of pouches (11) each formed from two sheet-metal plates (12, 13) stamped into the shape of cups, the concavities of which are turned towards one another and which are brazed together so as to be leaktight at their periphery, each pouch defining one of the said tubes and featuring, at each of its ends, an increased thickness so as to define a segment of fluid box.

8. The evaporator (30) as claimed in one of claims 1 to 6, wherein the fluid boxes are independent components (31, 32) featuring apertures (34) through which penetrate the ends of the tubes (1), the latter being brazed so as to be leaktight to the edge of the apertures.

9. The evaporator as claimed in claim 8, wherein each tube is formed from two stamped sheet-metal plates (1a, 1b) which are brazed together for leaktightness along their lateral edges (1c) and for stiffening at intermediate regions (1d) projecting towards the inside of the tube.

10. The evaporator as claimed in claim 8, wherein each tube is formed from two stamped sheet-metal plates which are brazed together so as to be leaktight along their lateral edges, the tube being stiffened by an insert brazed onto the inner faces of the plates.

11. The evaporator as claimed in claim 8, wherein the tubes are extruded tubes.

12. The evaporator as claimed in claim 8, wherein the tubes are formed from metal sheets which are folded and closed by longitudinal brazed joints.

13. The evaporator (30) as claimed in one of claims 8 to 12, wherein at least one fluid box (31) is formed from two elements (33, 37) delimiting an internal vol-

ume (45, 46), one of which (33) features the said apertures (34), and at least one affixed internal partition (39) separating the said internal volume into different chambers (45, 46) each of which communicates with one subset of the tubes.

14. The evaporator (30) as claimed in one of claims 8 to 13, wherein at least one fluid box (32) is formed from a manifold plate (33) featuring the said apertures (34), and of at least two tank-shaped elements (41, 42) interacting with the manifold plate, each over a part of the extent of the plate, so as to delimit respective chambers (47, 48) each of which communicates with a subset of the tubes.

15. The evaporator as claimed in one of claims 8 to 14, wherein at least one fluid box is formed from at least one stamped sheet-metal element (60) defining, on either side of a fold line (L), a manifold plate (62) featuring the said apertures (63) and a tank (61) which are brought edge to edge by folding and brazed together so as to delimit a chamber of the fluid box.

16. The evaporator as claimed in one of the preceding claims, in which the number of passes is chosen between 4 and 6.